

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.(currently amended) A method of interfacing for variable length packet and cell transfer between a first layer device and a second layer device comprising:

- (a) dividing control information into an in-band portion and an out-of-band portion, said control information having a plurality of control words;
- (b) transmitting the in-band portion of said control information along a hard-wired path for data from one of said first and second layer devices to another of said first and second layer devices, wherein said in-band control information controls data bus lanes and not data;
- (c) transmitting the out-of-band portion of said control information along a hard-wired path for control/signaling, different than said data path, from one of said first and second layer devices to another of said first and second layer devices; and
- (d) inserting in said data path a control of data signal to identify when the data path contains control information and when it contains data;

whereby re-encoding of data and insertion of control information upon pre-determined intervals is avoided.

- 2.(previously presented) A method according to claim 1, wherein said in-band portion is control information as to status and destination address of data being sent and to align parallel data lines that comprise a data path and said out-of-band portion is credit-based FIFO status flow control information;
whereby said interfacing is done independently in both transmit and receive directions and a number of credits granted to each port depends on an encoded state of a corresponding port status.
- 3.(original) A method according to claim 2, including using a "1 1" framing pattern on a FIFO status channel to mark boundaries of the framing pattern without requiring an out-of-band framing signal.
- 4.(currently amended) A method according to claim 1, including sending a training control pattern ~~sufficiently often~~ periodically in order to allow a receive interface to check and correct for de-skew on start-up and during regular operation to compensate for skew variations due to changes in voltage, temperature, noise and other factors.
- 5.(original) A method according to claim 1, using a clock in a direction opposite to the data path as a reference source for the data path transmitting from a side of the interface opposite to a transmitting end.

6.(previously presented) A method according to claim 4, wherein a transmitting end of the data path sends data and control signals precisely aligned with respect to a source-synchronous clock and the training control pattern once every MAX_T where MAX_T is configurable on start-up.

7.(previously presented) A method according to claim 1, wherein said control information has a plurality of control words and wherein each control word of said control information contains an error-detection code and one or more control words are inserted between bounded transfer periods whereby performance of the code is not degraded by overly long transfers.

8.(original) A method according to claim 1, wherein an end-of-packet event and error codes are combined into a two-bit code to reduce the number of bits required.

9.(previously presented) A method according to claim 1, wherein transfer information referring to a previous transfer and to a next transfer is contained in one control word of said control information.

10.(previously presented) A method according to claim 1, wherein a single control word of said plurality of control words may contain control information that applies to data preceding said single control word as well as data following said single control word.

11.(currently amended) A method of interfacing for variable length packet and cell transfer between a first layer device and a second layer device comprising:

- (a) dividing control information into an in-band portion and an out-of-band portion;
- (b) transmitting the in-band portion of said control information along a hard-wired path for data from one of said first and second layer devices to another of said first and second layer devices;
- (c) transmitting the out-of-band portion of said control information along a hard-wired path for control/signaling, different from said data path, from one of said first and second layer devices to another of said first and second layer devices;
- (d) inserting in said data path between data transfers a control of data signal to identify when the data path contains control information and when it contains data; and

(e) transmitting FIFO status flow information out-of-band whereby re-encoding of data and insertion of control information upon pre-determined intervals is avoided and whereby a FIFO fill level can be ascertained.

12.(currently amended) A method according to claim 11, wherein said first layer device is a physical layer (PHY) device and said second layer devices ~~has~~ are a transmit link layer device ~~operative to that~~ transmits data ~~from said transmit link layer device to~~ said PHY device, and a receive link layer device ~~operative to that~~ receives data from said PHY device.

13.(previously presented) A method according to claim 11, wherein said in-band portion includes packet address, delineation and error control coding and said out-of-band portion is FIFO status flow information whereby an interface between said first layer device and said second layer device operates independently in both transmit and receive directions.

14.(currently amended) A deskewing circuit for deskewing data arriving on a ~~plurality of~~ M data lines, comprising:

(a) ~~a plurality of~~ M serial-in parallel-out (SIPO) blocks, each of said ~~plurality of~~ M SIPO blocks coupled to a corresponding one of said ~~plurality of~~ M data lines, said M SIPO blocks ~~operative to converting~~ converting n-bit words of serial input data from said ~~plurality of~~ M data lines to parallel data, where n is an integer;

(b) M register sets coupled to said ~~plurality of~~ M SIPO blocks, each of said M register sets ~~operative to stor[e]ing~~ storing most recent Wx n-bit words of serial input

data arriving on each of said plurality of data lines, where M and W are selected from the series 1, 2,K, where K is an integer;

(c) a training detector block coupled to said M sets of registers and ~~operative to detecting~~ the presence of a training pattern based on the contents of said registers;

(d) a plurality of transition detection blocks each coupled to one of said M sets of registers and ~~operative to searching~~ and ~~to detecting~~ a transition in each bit position within each one of said M sets of W registers; and

(e) an aligner block coupled to a said plurality of ~~said~~ transition detection blocks ~~operative to selecting~~ appropriate bits within each of said M sets of registers from which to read each bit in order to present a deskewed output.

15.(currently amended) A deskewing circuit, comprising:

(a) 17 serial-in parallel-out (SIPO) blocks, each one coupled to a corresponding input data line of a plurality of data lines which transmit serial data to said SIPO blocks and ~~operative to convert~~ serial input data to parallel output data, each of said SIPO blocks having an n bit output[s] where n is an integer equal to a word size of said parallel output data ~~output~~ from each of said SIPO blocks, each of said SIPO blocks

having a separate bit output[s] for each bit of ~~an~~ said n-bit parallel output data word contained therein;

(b) ~~M~~ 17 register sets coupled to said 17 SIPO blocks, each of said ~~M~~ 17 register sets ~~operative to stor[e]~~ storing most recent $W \times n$ -bit words of data arriving on each of said ~~plurality of 17~~ input data lines, where W is the number of registers ~~and M~~ and W are integers selected from the numbers in series 1,2, ...,K where K is an integer

(c) a training detector block coupled to outputs of said ~~M~~ 17 sets of registers ~~operative to~~ which detect the presence of a training pattern based on the contents of said ~~M~~ 17 sets of registers;

(d) 17 transition detection blocks coupled to respective outputs of said ~~M~~ 17 sets of registers with each of said 17 transition detection blocks having $n \times W$ inputs where n is the number of bits in each register and W is the number of registers, when after the presence of the training pattern has been detected ~~in~~ within said $n \times W$ bits of each of said 17 registers ~~one of said registers~~ by an associated one of said transition detection blocks, one of said transition detection blocks ~~is operative to searches~~ searching for a transition on bits within the training pattern detected by said training detector ~~one of said 17 bit positions~~; and

(e) an aligner block coupled to outputs from said 17 transition detection blocks ~~operative to select~~ an appropriate register and bit within said

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~~appropriate register~~ a bit from within the $n \cdot W$ bits of each of the 17 register sets to read
~~from which to read each bit~~ in order to present a deskewed output.